

EXHIBIT 5

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION**

Blue Spike, LLC,

Plaintiff,

v.

Texas Instruments, Inc., et al.,

Defendants.

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CASE NO. 6:12-cv-499-MHS-CMC

LEAD CASE

Jury Trial Demanded

**TECHNICAL EXPERT REPORT OF
YANNIS PAPAKONSTANTINOU, PH.D.
REBUTTAL OF INVALIDITY REPORTS
BY DR. JOHN STRAWN AND
DR. SCHUYLER QUACKENBUSH**

that the *Graham* Factors control the obviousness inquiry, and that the combination of known elements is obvious if: “there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” I also understand that the Supreme Court set forth several non-exclusive reasons that a patent claim of a combination of known elements may be obvious, including if it claims: the “combination of familiar elements according to known methods...[that] does no more than yield predictable results”; a “predictable variation” of a work from another field of endeavor; or a solution that was “obvious to try” because there were a finite number of identified, predictable solutions at the time of invention.

C. Prior Inventorship

40. I understand that under 35 U.S.C. § 102(f), a patent is invalid if the named inventor “did not himself invent the subject matter sought to be patented.” I understand that this provision requires that the patent “accurately list the correct inventors of a claimed invention.” *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1349 (Fed. Cir. 1998). That is, if all inventors are not accurately named, the patent is invalid. I have further been informed that all that is required for an individual to be a joint inventor is that he or she: (1) contribute in some significant manner to the conception or reduction to practice of the invention, (2) make a contribution to the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention, and (3) do more than merely explain to the real inventors well known concepts and/or the current state of the art. *Id.* at 1351. I understand that if any individual satisfies these three requirements and is not named as an inventor on the patent, the patent is invalid.

D. Indefiniteness

finding that the intrinsic evidence informs, with reasonable certainty, those skilled in the art about the scope of each of the disputed terms/phrases”). In particular, the Court reasoned that in light of the intrinsic evidence, Audible Magic “failed to demonstrate any requirement for deference to expert opinions as to whether a person of ordinary skill in the art would find a claim indefinite,” noting “a court should discount any expert testimony that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.” *Id.* at 3-4 (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1318 (Fed. Cir. 2005)).

219. Given such clear guidance from the Court on this matter of law, a matter which the Court has now twice addressed, it is my opinion that it is inappropriate for me to render my own opinions on the definiteness of the claims at this juncture, as it would not aid in the Court or jury’s determination of these issues. Further, as Audible Magic has raised no new issues, I incorporate by reference the magistrate judge’s Report and Recommendation (Dkt. No. 1832) and this Court’s Memorandum Order Adopting Report and Recommendation (Dkt. No. 1892). I reserve my rights to amend this report as to this issue should the Court agree that Audible Magic is indeed entitled to another attempt to raise this issue.

VI. 102(f): LACK OF EVIDENCE OF PRIOR INVENTORSHIP

220. I am not convinced by Dr. Quackenbush’s argument that the Blue Spike patents-in-suit are invalid on the basis of prior inventorship by Muscle Fish employees, Thom Blum (“Blum”), Doug Keislar (“Keislar”), Jim Wheaton (“Wheaton”), and Erling Wold (“Wold”). I understand that Audible Magic must provide clear and convincing

evidence of prior inventorship by someone other than the named inventors, and I believe there is insufficient evidence to invalidate the patents on this basis.

221. In my opinion, there are several key innovations in the patents-in-suit that were independently conceived of by one or both of the listed co-inventors. These include the abstract's ability to differentiate between versions of a signal, account for NULL cases, and the application of cryptographic functions to enhance uniqueness and identification within the method of signal monitoring and analysis. That the patents-in-suit claim novel aspects of signal monitoring and analysis, which separately and taken as a whole, are not claimed or disclosed in the Muscle Fish prior art, factors heavily in my reasoning.

222. The record indicates that the named inventors' conception of the claimed invention arose out of Blue Spike, Inc.'s work in watermarking. Mr. Berry testified as follows regarding how the use of signal abstracts in data signal analysis was conceived:

I think there . . . was discussion of attempting to be able to have an improved watermark system based on knowing something more about what the original was before attempting to do a decode. And I believe that that's where the idea originally came from for attempting to have a database of abstracts from which to attempt to identify a signal before attempting to remove — you know, extract a watermark from it.

Q: Okay. So are you saying that the — kind of germ of the idea of abstracting was analyzing a signal in order to understand something about it to determine where to put a watermark?

. . .

THE WITNESS: No, not to determine where to put a watermark; to determine — *to attempt to aid in decoding the watermark by identifying an original.*

Q: How would identifying an original aid in decoding a watermark?

A: *If you have the original signal, then you have a better chance of doing — taking a difference between the original signal and the one you're attempting to decode, which can aid not just in extracting the encoded signal but also in understanding and perhaps undoing operations that it — you know, such as compression, that might have taken place on the encoded media in between the — you know, between the encoding and the decoding.*

[Mike Berry Deposition, 18:11-19:13 (emphasis added)].

223. Mr. Berry's testimony explains that the inventors of the Blue Spike patents-in-suit conceived of the need to compare a watermarked signal with the original signal. Mr. Moskowitz and Mr. Berry conceived of creating a database of "original signal" abstracts against which the watermarked signals could later be compared. This appears to me to have been a reasonable technical solution and it covers several key elements in the patents-in-suit, including the creation, storage, and matching of abstracts.

224. I have reviewed evidence indicating that the Blue Spike inventors conceived of the idea of "abstracts" at least as early as May, 1999. [Ex. C, Email from Mike Berry to Stephan M. Sprenger].

225. It is my opinion based on a review of deposition testimony and related documents that any communications between Mr. Moskowitz or Mr. Berry and the alleged Muscle Fish inventors did not involve significant or detailed disclosures of the Muscle Fish invention. I am not aware of any evidence that the communications revealed more than the current state of the art. I understand that because this prong of the prior inventorship test is not met, then a finding of prior inventorship is inappropriate.

226. The lack of disclosure to the named inventors is corroborated by Mr.

Berry's testimony. For example, Mr. Berry testified

Q: So do you believe that you and Mr. Moskowitz came up with your idea of what a signal abstract is, as opposed to things that came before?

A: I was not aware of any prior art in this area.

[Berry Deposition, 13:6-11].

227. Further evidence points to the fact that very little disclosure could have taken place between Mr. Moskowitz and/or Mr. Berry and the alleged prior inventors. For example, Mr. Blum testified that his earliest interaction with Mr. Moskowitz in 1997 or 1998 concerned the Datablade technology and a high-level discussion of signal analysis. [e.g. Moskowitz Deposition, 238:2-241:10]. Likewise, Mr. Berry testified that although he completed contract work for Muscle Fish in 1997, 1998, and possibly 1999, none of his “projects relate[d] to [the] method and device for monitoring and analyzing signals that was marked as Exhibit 1.” [Berry Deposition, 142:8-11].

228.

228. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

229. In my experience in the relevant art, it is common practice to engage in high-level discussions about the state of the art as both an intellectual and practical exercise. That Mr. Moskowitz and/or Mr. Berry at various points before and after the filing of the '472 Patent application communicated with members of the Muscle Fish team does not show prior inventorship on the part of the Muscle Fish developers, and in my opinion lends little factual support to Audible Magic's argument. On the contrary, I would expect high-level conversations such as these between experts working in the same field. I believe that placing too great an emphasis on casual exchanges, such as those in 1997 or 1998 regarding the Informix database system [e.g. Blum Deposition, 238:2-20], would stifle creative and technical collaboration. I note that at least one Muscle Fish employee discussed the climate of collaboration and ease of finding out about Muscle Fish in the relatively small sub-specialties of "audio recognition, audio identification, or

multimedia identification or recognition, maybe image recognition or facial recognition.” [Blum Deposition, 242:1-18]. Indeed, the prior inventorship legal standard seems to require a much greater disclosure of information than occurred between Blue Spike and Muscle Fish. I am not persuaded that prior inventorship is indicated by communications between the Blue Spike inventors and Muscle Fish and/or Audible Magic.

230. I believe this finding is further supported by the fact that none of the alleged prior inventors testified to any facts or even a belief that Mr. Moskowitz or Mr. Berry took proprietary information from Audible Magic. [e.g. Blum Deposition, 261:15-271:9; Keislar Deposition, 164:2-170:4; Wheaton Deposition, 203:3-206:11].

231. I am also of the opinion that the alleged licenses of Muscle Fish and/or Audible Magic technology do not indicate prior inventorship for a number of reasons. First, the licensed technology was not used in the asserted patents-in-suit. Second, critical “fingerprinting” algorithms were not licensed to Blue Spike. And third, FFT and resampling technology is not invalidating prior art to the central content-based recognition claims of the asserted patents-in-suit.

232. [REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

elements of Blue Spike’s watermarking and not signal abstract technology claimed in the patents-in-suit, I do not believe the licenses of these technologies is relevant to the prior inventorship analysis.

233. Also, Audible Magic explicitly admits that Muscle Fish “did not license the fingerprint algorithms to Scott [Moskowitz],” which I believe is further evidence that the named inventors were not aware of alleged Muscle Fish prior art. [e.g. Blum Deposition, 247:14-15].

234. Finally, it is my opinion that resampling and FFT technology licensed from Muscle Fish did not represent novel art, but rather, as Mr. Berry testified, “these are general processes that are well-known in the field” of signal processing. [Berry Deposition, 150:21-151:4].

235. Dr. Quackenbush spends considerable effort to highlight similar language used in the patents-in-suit as well as the Muscle Fish patents, Audible Magic patents, and other prior art evidence. I am unconvinced that these similarities imply prior inventorship of the Muscle Fish developers. Dr. Quackenbush’s reliance on similar terms ignores that (1) many of the terms employed in the patents-in-suit are terms of art that have been used in the art prior to Audible Magic; (2) similarities are expected given the limitations of the English language; and (3) at least one of the terms indicated by Dr. Quackenbush does not appear in the patents-in-suit at all. The following is a list of terms Dr. Quackenbush considers evidence of prior inventorship, including the date of first use in a patent, and a sample list of patent references prior to September 7, 2000 that use the terms in a context similar to Muscle Fish/Audible Magic:

Term/Phrase	Examples of Prior Use (Filing Date)
“perceptual	March 14, 1986 - WO 1986005617 A1, Processing of acoustic

features”

waveforms (“The component values are interpolated from one frame to the next to yield a representation that is applied to a sine wave generator. The resulting synthetic waveform preserves the general waveform shape and is **perceptually indistinguishable** from the original. Furthermore, in the presence of noise the **perceptual characteristics** of the waveform as well as the noise are maintained. The method and devices disclosed herein are particularly useful in speech coding, time-scale modification, frequency scale modification and pitch modification. . . .”)

March 28, 1990 - US 5103306 A, Digital image compression employing a resolution gradient (“**Perceptual principles** and implementation methods are further described below. There is first described the perceptual distribution of resolution over the human visual field, and the separation of **perceptual features** into channels.”)

March 12, 1991 - US 5559900 A, Compression of signals for perceptual quality by selecting frequency bands having relatively high energy (“Based on the input signal and on a **preselected perceptual model**, a "just noticeable difference" (jnd) noise spectrum is computed. . . . Linear predictive coding in the speech environment dates back to the mid 1960's. The article by B. S. Atal and M. R. Schroeder titled "Predictive Coding of Speech Signals", Proceedings of the 1967 Conference on Communications and Processing, Cambridge, Mass., pp 360-361, is an early example of that. Later, it has been recognized that predictive coding may be improved by taking account of the not unlimited ability to perceive noise. For example, the article by M. R. Schroeder, B. S. Atal and J. L. Hall titled "Optimizing Digital Speech Coders by Exploiting Masking Properties of the Human Ear", Journal of the Acoustical Society of America, December 1979, pp 1647-1652, describes the benefits that may accrue from considering the **perceptual characteristics** of the human ear.”)

April 21, 1997 - US 5745873 A, Speech recognition using final decision based on tentative decisions (“The number of filters then determines the number of the processing channels which again are essentially independent of each other. The types of parameters used for training and recognition in the sub-bands can also both be different from each other because the acoustic signals carry different portions of the **perceptually relevant information**. Some sub-bands can use time domain based vector parameters as described above, and other sub-bands can use vector parameters based on the Fourier spectrum, or based on the linear prediction spectrum.”)

	<p>January 25, 1999 – US 6411953 B1, Retrieval and matching of color patterns based on a predetermined vocabulary and grammar (“The invention provides a perceptually-based system for pattern retrieval and matching, suitable for use in a wide variety of information processing applications. The system is based in part on a vocabulary, i.e., a set of perceptual criteria used in comparison between color patterns associated with information signals, and a grammar, i.e., a set of rules governing the use of these criteria in similarity judgment. The system utilizes the vocabulary to extract perceptual features of patterns from images or other types of information signals, and then performs comparisons between the patterns using the grammar rules. The invention also provides new color and texture distance metrics that correlate well with human performance in judging pattern similarity.”)</p>
“subjective features”	<p>September 3, 1981 - US 4425661 A, Data under voice communications system (“While the objective absolute value of the noise level is important, the subjective characteristic of “how the noise sounds” is the primary consideration. Spread spectrum techniques not only reduce the objectionable noise level--but also make the remaining noise much less noticeable. The preferred embodiment of the invention illustrates a method of generating a spread spectrum signal having two frequencies for a mark and two other frequencies for a space. . . .”)</p> <p>November 25, 1998 – US 20010041020 A1, Photocollage generation and modification using image recognition (“Examples of algorithms used to determine subjective features of an image are described in Proceedings of the IEEE Computer Society conference on Computer Vision and Pattern Recognition, June 1997. These subjective features provide clues about the subjective quality of the image. The objective and subjective features calculated for each image are combined and the images are ranked according to the relative importance of each feature analyzed to the processing goal [] and which matches the stored customer preferences [].”)</p>
“audio objects”	<p>February 10, 1992 - US 5351276 A, Digital/audio interactive communication network (“The audio network server stores, and plays back, digital representations of voice objects from, and to, a telephone handset. An instruction set accessible from the digital network controls operation of the audio network server and thus the telephone system to record and play back audio information stored on the audio server. . . .</p> <p>13. A communication system, comprising: digital network means for communicating digital information throughout a digital network, the digital network means including at</p>

least one work station at which a human being user can gain access to the digital network;
media presentation server means for presenting a media component object stored therein to the user, the media presentation server means including
a mass data storage device, and
caching means for retaining a cached set of media component objects in the data storage device; and
command means within the digital network means for controllably commanding input/output operation of the media presentation server means to communicate the electronic representation of audio information and the acoustic audio information between an audio data storage means and an audio communications network.
14. The communication system of claim 13, wherein the media presentation server includes an audio server and the cached set of component objects are **audio objects**.”)

October 25, 1996 - US 6108626 A, Object oriented audio coding (“Audio sources are coded by recognizing different classes of audio such as speech and music. The classes are used to select between coding algorithms and to provide object definitions. Objects have abstract and concrete classes which may further rely on parameters produced by linear prediction and subband filters to provide a frame-based bit stream of information. Each object in the bit stream has layers of information such as basic bit rate, coding parameters and enhancement parameters. The layers of information in each object allow altering selected parameters to manipulate audio signals.”)

January 31, 1997 - US 5936659 A, Method for video delivery using pyramid broadcasting (“We have trialed our invention using one Sun workstation as a server, another Sun workstation as a client, and an ethernet network connecting the servers as the wide band network for delivery of the VOD services. Local disks were used as the buffer for storing the future data segments. 38.4 Kbps **audio objects** and MPEG compressed video objects were used as data objects. All of the video objects were of the same size. The user selects video objects or songs from a menu-driven interface. The selection has to be homogeneous, i.e. all video objects or all **audio objects**. The number of channels to be opened and the total bandwidth are also provided as inputs.”)

“segmentation”

September 20, 1996 – US 6314392 B1, Method and apparatus for clustering-based **signal segmentation** (“In a computerized method a continuous signal is **segmented** in order to determine statistically stationary units of the signal. . . . Accurate identification of statistically stationary units in a continuous signal can lead to a

	<p>substantial reduction in computational costs while processing the signal. Statistically stationary units are discrete portions of the continuous signal that have characteristics which can statistically be described in a similar manner.</p> <p>The identification of the stationary units requires the location of segment boundaries. If the segment boundaries are correctly hypothesized, then the effort required to correlate information related to the units is greatly reduced. Segmentation is particularly difficult where there is little prior knowledge about the underlying content of the signal.</p> <p>For example, in a speech recognition system, a continuous signal is processed to determine what has been spoken. Segmentation of the signal into statistically stationary units is an important sub-process in a segment-based speech processing system. Segmentation identifies possible boundaries of portions of the signal which are likely to correspond to linguistic elements.”</p>
<p>“‘data reduced’ representation”</p>	<p>January 3, 1986 – US 4797929 A, Word recognition in a speech recognition system using data reduced word templates (“Data reduced word templates represent spoken words in a compacted form. Matching an incoming word to a reduced word template without adequately compensating for its compacted form will result in degraded recognizer performance. An obvious method for compensating for data reduced word templates would be uncompacting the reduced data before matching. Unfortunately, uncompacting the reduced data defeats the purpose of data reduction. Hence, a word recognition method is needed which allows reduced data to be directly matched against an incoming spoken word without degrading the word recognition process.”)</p> <p>March 22, 1993 – US 5659660 A, Method of transmitting and/or storing digitized, data-reduced audio signals (“A method of encoding an audio signal for transmission and/or for storage includes changing a digitized audio signal based on a selected signal changing criteria. The changed digitized audio signal is encoded, based at least on an available data rate for transmitting and/or storing the audio signal, for reducing an amount of data associated with the changed, digitized audio signal. The reduced-data audio signal is then evaluated for determining whether a code overload condition exists. If a code overload condition exists, another signal changing criteria is selected. A time behavior and/or a spectral distribution of the digitized audio signal is recursively changed based on the another signal changing criteria before the amount of data associated with</p>

	<p>the digitized audio signal is reduced so that deterioration of reduced-data audio signal is not perceptible when the coded signal is decoded. The recursively changed digitized audio signal is encoded for reducing an amount of data associated with the recursively changed digitized audio signal based at least on the available data rate. Lastly, the recursively changed encoded reduced-data digitized audio signal is transmitted and/or stored. . . . The invention relates to a method of transmitting and/or storing digitized, data-reduced audio signals. Such a method is known, for instance, from the European patent specification 290 581.”)</p> <p>June 6, 1995 – US 5530655 A, Digital sub-band transmission system with transmission of an additional signal (“Digital sub-signals or subband signals representing at least first and second data-reduced components are combined with at least one auxiliary digital signal in defined frame portions before transmission.”)</p>
<p>“reference abstract”; <i>see also</i> “reference fingerprint” and “reference database”</p>	<p>March 26, 1962 - US 3201961, Control device (“In one aspect thereof, a door control system constructed in accordance with our invention is characterized by the provision, in combination with a door control member, of means operating the control member automatically in response to a pre-selected fingertip pattern, the operating means including means for scanning a fingertip and generating a first signal corresponding to the pattern thereof, means for simultaneously scanning a reference fingerprint and generating a second signal corresponding to the pattern thereof, and means responsive to correspondence of the first and second signals for operating the door control member only upon substantial identity between the two patterns.”)</p> <p>August 14, 1992 - US 5276629 A , Method and apparatus for wave analysis and event recognition (“The FINGERPRINT procedures take a Spectral File of a source wave from a known vibrational source and calculate, extract, and store (in the Fingerprint File) the Spectral File's frequency and amplitude slope ratios, peak locations, settle times, frequency distribution widths, and width forms. The FINGERPRINT procedures calculate a Fingerprint amplitude level by summing the individual associated partial amplitudes and then comparing this amplitude total to the amplitude total of a previously stored Fingerprint, the "amplitude reference Fingerprint", which has been generated from a known event with a known amplitude. The Fingerprint amplitude level and the information identifying the vibration source and fundamental frequency are then stored in the Fingerprint File.”)</p>

“monitoring”	<p>July 15, 1971 – US 3845391 A, Communication including submerged identification signal (“Accordingly. it is another purpose of this invention to provide an automatic program monitoring technique that can be employed in both television and radio broadcasting.”)</p> <p>May 2, 1986 – US 4739398 A, Method, apparatus and system for recognizing broadcast segments (“A broadcast signal is monitored and digitally parametrized. For each frame of the parametrized monitored signal, the library is searched for any signature that may be associated with that frame. Using the frame information stored with the signature, each of the potentially associated stored signatures is compared to the appropriate frames of the parametrized signal. If a stored signature compares with the monitored data, a match is declared and the broadcast segment is identified using identification data associated with the signature.”)</p> <p>February 28, 1995 – US 5579124 A, Method and apparatus for encoding/decoding broadcast or recorded segments and monitoring audience exposure thereto (“Methods and apparatus for encoding and decoding information in broadcast or recorded segment signals are described. In certain embodiments, an audience monitoring system encodes identification information in the audio signal portion of a broadcast or recorded segment using spread spectrum encoding. A personal monitoring device receives an acoustically reproduced version of the broadcast or recorded signal via a microphone, decodes the identification information from the audio signal portion despite significant ambient noise, and stores this information, automatically providing a diary for the audience member which is later uploaded to a centralized facility.”)</p>
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236. In light of the above analysis, which is merely representative and which by no means constitutes an exhaustive search of the prior art (indeed, I conducted a cursory search of only prior art within the patent system), I do not find the alleged similarity of terminology or nomenclature to be persuasive evidence of prior inventorship. As the terms, “perceptual features,” “subjective features,” “audio objects,” “segmentation,” “‘data reduced’ representation,” “reference abstract,” “reference fingerprint,” “reference database,” and “monitoring” predate any alleged Muscle Fish or Audible Magic prior art

reference, I am convinced that any similarity in language is reflective only of the fact that they were in common usage in the field of signal processing by the time the named inventors filed their patent applications.

237. Second, I believe at least several of the terms Audible Magic's expert has highlighted are in common usage for lack of alternatives in the English language. For example, the parties' agreed construction for the term, "subjective characteristic," which is a synonym for "subjective features," is "characteristic perceived differently by different people." *See* Claim Construction Order, Dkt. 1831 at 9. Indeed, I note that this is not precisely a term of art but rather the common English definition of "subjective" (as in the antonym of "objective"). I would be hard-pressed to delineate an alternative term to use in the place of "subjective" for the patents-in-suit or any other intellectual exercise in this field. Similarly, the parties construed "reference database" as meaning, "a database containing abstracts of reference signals." *Id.* at Exhibit A. Indeed, the Court agreed "that the term 'reference database,' should be given its plain and ordinary meaning." *Id.* at 16. This lends support that there is nothing particularly special about terms like "reference database," and I view any purported similarity between the language of the patents-in-suit and the Muscle Fish/Audible Magic prior art as an artifact of the limitations of the English language.

238. Finally, I note that the term "audio signals," which has been used extensively in the prior art as I mentioned earlier, does not explicitly appear in the patents-in-suit, although I acknowledge that "objects" are explicitly contemplated by the patents-in-suit. The broader term, "objects," finds even greater usage within the context of signal processing. As the term "audio object" does not appear in the patents-in-suit, I

believe the premise that the similarity in language between patents-in-suit and prior art references is faulty. Audible Magic's expert has not even shown as a threshold matter that the terms are used in both art references. For this reason and those already discussed, I am disinclined to opine that the alleged similarity in terms or nomenclature is indicative of prior inventorship by the employees of Muscle Fish.

Dated: May 11, 2015

Yannis Papakonstantinou

Dr. Yannis Papakonstantinou